

**ABSTRACT OF THE DISCLOSURE**

In a quadrupole ion trap mass spectrometer, a library of optimized notched waveforms are pre-calculated, optimized and stored in a fast memory such as semiconductor RAM. Computer controlled apparatus selectively applies the pre-calculated waveforms to end caps of the quadrupole ion trap for isolating an ion with a specific mass to charge ratio. The pre-calculated waveforms are optimized notch waveforms with each waveform being pre-calculated for a specific mass. The memory further stores a library of single frequency CID waveforms for use in collision induced dissociation of an isolated ion. By providing the pre-calculated waveforms, a method is provided to isolate and dissociate a selected ion.